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Chemical reaction

Pest control enters an environmentally friendly era

Like all public buildings, hospitals are veritable magnets for pests. Food service areas in hospitals are just as threatened by fly and rodent infestations as restaurants. Loading docks, waste disposal and storage areas in hospitals are just as vulnerable to invasions from beetles as office complexes. Bathrooms in hospitals are

just as susceptible to swarms of cockroaches and termites as schools and sports facilities.

But when it comes to pest control, hospitals have special problems. Because they harbor sensitive, sterile operating rooms and other therapeutic environments and house seriously ill patients, hospitals need to balance the need for ridding their premises of nuisance and disease-carrying pests against the effects of toxic pesticides on indoor air quality, the potential for triggering acute poisoning and allergic reactions in patients and staff, and the risk of long-term effects from exposure to toxic pesticides. These may include leukemia, myeloma, and cancer of the lip, lymphatic system, prostate and stomach; birth defects; anemias and other blood disorders; abnormal immune, kidney and liver function; and behavioral, neurological and psychological conditions.

Although chemicals certainly form the backbone of a pest control program, advances in the pest management industry over the past 10 to 15 years have produced a new generation of pesticides that home in on specific pests, exert less impact on the environment and pose minimal risks to people and beneficial plants and animals.

Combined efforts

Pest control has shifted from broad strategies that blanket baseboards with heavy-duty agents regardless of the nature or degree of infestation to combi-

nations of biological, cultural, physical and chemical tools, according to the National Pest Management Association.

These include traps that confine pests, exclusion devices and repellents that prevent insects or rodents from entering a structure, nonpesticide pesticides that are derived from plant oils and chemicals that are exempt from registration by the Environmental Protection Agency (EPA) because they have not produced any harmful effects in mammals, says Frank Meek, national pest-control technical director



Hospitals just aren't aware of their options regarding less-hazardous substitutes.

for Orkin Inc., Atlanta, Georgia.

Many hospitals have not yet made the switch to safer alternatives, however. According to the first nationwide survey of hospitals on the subject released in November 2003 by environmental groups Health Care Without Harm and Beyond Pesticides, 100 percent of hospitals still use chemical pesticides.

Ninety-one percent of the hospitals use chemical pesticides inside buildings, and 77 percent use them on hospital grounds. Thirty-two percent of hospitals use pest control products containing pyrethrin, a substance derived from naturally occurring chrysanthemum plants that is highly toxic and often combined with other high-risk pesticide chemicals.

The active ingredients in the 37 pesticides used most commonly in surveyed hospitals have serious health-related side effects. Sixteen are possible

carcinogens; 13 have been linked with birth defects and 15 to reproductive problems; 22 are neurotoxins; 18 cause kidney or liver damage; and 28 cause eye irritation and skin rashes.

These common pesticides also endanger the external environment: 21 can contaminate groundwater; 14 are toxic to birds; and 30 are toxic to fish and other aquatic life.

Yet toxic pesticides have less hazardous substitutes. Instead of pyrethroids, which are possible carcinogens, flypaper, fly swatters, ultraviolet light or nontoxic attractant traps effectively control common flies. Rather than organophosphate insecticide, including diazinon or chlorpyrifos, which can cause acute poisoning, vacuuming, glueboards, pheromone traps or volatile baits and boric acid gels can eliminate cockroaches.

Just aren't aware

Hospitals just aren't aware of these options, says Kagan Owens, program director for Beyond Pesticides, Washington, D.C., and author of "Healthy Hospitals Controlling Pests without Harmful Pesticides," a full report of the survey that can be found at www.noharm.org/details.cfm?ID=864&type=document.

The survey admittedly was small; it included 22 hospitals from 12 states and the District of Columbia with bed sizes ranging from 93 to 998. However, its findings are consistent with the only known previous investigations of the use of pesticides in health care facilities, one in Department of Veterans Affairs (VA) hospitals and another in New York City hospitals. And because the survey was voluntary, it most likely over-represents hospitals that are starting to adopt safer pesticides, says Owens.

So, on the one hand, the continued use of chemical pesticides in hospitals shown by the survey is disappointing, if understandable. "People who run hospitals or work for hospitals don't even know what pesticides are being used in their facilities," says Owens. "They don't even know they should be concerned about some of these chemicals."

On the other hand, the experiences of surveyed hospitals that have drastically reduced their reliance on chemical pesticides are encouraging.

Among the hospitals highlighted in the survey report, Oregon Health and Science University, which includes two hospitals in Portland, has cut back insecticide and fungicide applications by 80 percent. San Francisco General Hospital avoids pesticides and herbicides 99 percent of the time. Forty-five percent of hospitals are using one or more pesticides containing boric acid, a relatively nonvolatile and inorganic compound that is less hazardous than highly volatile chemical pesticides for eradicating insects, fungi and weeds. And VA hospitals allow no chemical pest control methods when there are safe alternatives, such as nonchemical pest

THE KEY TO 'GREEN' PEST CONTROL

Reducing or even eliminating the use of dangerous or environmentally hazardous chemicals in a pest control effort is a laudable goal, but the switch must be part of an overall strategy to be truly effective. That's where Integrated Pest Management (IPM) comes in.

IPM combines multiple tactics, starting with nonchemical methods like better sanitation and exclusion, to prevent pests. In IPM programs, pesticides are used only when necessary to achieve acceptable levels of control with the least possible harm to humans, nontarget organisms and the environment.

Hospitals are sensitive to pests and pesticides because both can threaten immunocompromised patients, says Dr. Zia Siddiqi, quality assurance director for Orkin Inc., Atlanta. "So you have to look for smarter ways to manage pests safely. IPM definitely should be the basis for any hospital's pest control program."

A 2003 survey published by Health Care Without Harm (HCWH) and Beyond Pesticides, two environmental groups concerned with pesticide use, showed that most top U.S. hospitals use IPM to keep pests at bay. However, it also showed that all the respondents were still using pesticides. "We'd like to see hospitals focus more on nonchemical methods," comments HCWH's Dr. Ann McCampbell.

Moreover, only 14 percent of respondents to the survey said they post notifications for both indoor and outdoor pesticide applications. "If hospitals do turn to pesticides, we feel it is important that they do a better job of notifying patients and staff," McCampbell adds.

Indeed, notification practices appear to be one of the big failings of current pest control practices.

The pest management industry must lead the charge for better notification, says Orkin's Siddiqi. "Even the best IPM programs may call for occasional pesticide applications to keep pests under control, especially in certain areas of the country," he explains. "But, by posting appropriate notifications before applying any chemicals and keeping the areas cleared for a period after these applications, you can protect sensitive patients."

The 62-page survey report can be accessed at www.noharm.org/details.cfm?ID=864&type=document. —HFM staff



control, minimally toxic pesticides and biological controls.

Some of the methods

So, how are hospitals integrating newer approaches into their pest control efforts? Here is a look at some of the methods:

• **Nonchemical pest control.** “All pest infestations can be handled with nonchemical procedures. For example, physical removal with a vacuum as a first choice,” says Meek. A small packet or even a large infestation of cockroaches contained in a centralized area can be removed with a vacuum. Then minimal quantities of low-impact materials, such as cockroach bait, will take care of any cockroaches that escape the vacuuming. “I’ve never seen a situation where we had to go back in and, for lack of a better expression, ‘nuke’ a facility,” Meek adds.

Other nonchemical methods of pest control include high-pressure water systems that wash insects away from outdoor plants, manual removal of insects, heating or combination strategies. San Francisco General Hospital uses vacuuming to eliminate flying insects, such as bees and wasps, inside buildings; and pressurized water spraying to take care of aphids on outside plants.

Dry heating keeps rolling stock, such as transport carts and IV stands, free of pests. Vacuuming followed by heating destroys nests of bed bugs in mattresses, and heating removes beetles from pallets in the loading dock, says Dr. Austin Frishman, a former professor of biology at State University of New York, and now a well-recognized, Florida-based consultant in pest management.

Baits are considered to be the best methods of controlling insects such as ants, bees, termites and wasps because they contain less-toxic poisons in small quantities and release at most only minimal amounts of chemical substances in the air. Baits also have an additive effect because pests carry the poisons back to their lairs and infect their neighbors. Small disk baits that have no effect on air quality are so nonintrusive they can be inserted in very sensitive environments, says Frishman.

Baited or sticky traps identify the

types of pests that are invading so a hospital can select the most targeted method of control and track the effectiveness of pest management as well as physically extricate pests from the premises. Brigham and Women’s Hospital sets out baited traps to capture rodents, and Oregon Health and Science University places sticky traps in and around rhododendrons as a substitute for spraying with acephate insecticide.

Phillip Way, landscape and grounds coordinator in the Oregon Health and Science University facilities management and construction division, explains that the conventional recommendation for disposing of root weevils from susceptible rhododendrons is spraying with acephate. However, acephate is an organophosphate insecticide that can cause fatigue, headaches, nausea, stomach cramps and respiratory difficulties.

In contrast, sticky traps catch root weevils, which emerge from the soil at night and are most active during a six-to-eight-week period in May and June, without affecting the grounds crew that place them among the shrubbery or patients, visitors or staff who pass by.

Indoor traps are the rule for controlling rodent populations inside hospitals, according to the American Society for Healthcare Environmental Services (ASHES). Only in highly unusual circumstances when trapping is insufficient should hospitals turn to chemical rodenticides. Even then, rodenticides should be contained in EPA-approved tape-resistant bait boxes or restricted to areas that are not accessible by patients, visitors or staff. (See ASHES’ June 2000 *Professional Development Series* publication on Integrated Pest Management, which can be purchased online at www.ahaonlinestore.com/ProductDisplay.asp?ProductID=510&cartID=1940440&pc=org&OrgID=1.)

Silica gel, which is made of sand, stops roaches and other crawling insects from worming their way into hospitals by cutting into their exoskeletons, and organic cleaners containing bacteria that consume grease and grime prevent roaches from congregating in drains and sinks by eliminating the attraction.

• **Safer pesticides.** On top of the list of least-hazardous pesticides particularly for eradicating ants and cockroaches is boric acid, which occurs naturally and is not volatile. Boric acid pesticides are available as baits, dusts, gels and sprays, and as long as they are concentrated in areas away from human contact, they pose few health risks.

Insecticidal soaps made of potassium or sodium hydroxide derivatives of fatty acids and vegetable oil are not toxic unless they are accidentally ingested and are suitable for small areas of infestation.

The naturally occurring *Bacillus thuringiensis* soil bacterium can be found in more than 400 pesticide products for controlling black flies, gypsy moths and mosquitoes.

In addition to selecting less-toxic pesticides, hospitals also can engage in preventive pest control to minimize infestations. For the past few years, Way has been spraying street and ornamental trees during their dormant period in the winter with a horticultural oil and a lime sulfur additive. The process is cost effective—about \$25 per tree—and saves the grounds crew from having to return with a more toxic pesticide to take care of major infestations in the spring.

• **Biological controls.** Pests can be controlled naturally by introducing predators and parasites or companion plantings of foliage such as Shasta daisies or marigolds that attract beneficial insects, says Way.

A ways to go

According to results from the Healthcare Without Harm and Beyond Pesticides survey, hospitals still have a ways to go when it comes to adopting safer methods of controlling pests.

Hospitals should look at their programs and realize there are alternatives that can make the environment better for staff and patients, says Owens.

“The population that is using the health care facility is trying to get better,” she adds. “We don’t want to be debilitating them.” ■

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